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## **RESEARCH ON EMPLOYEE SATISFACTION OF SOFTWARE DEVELOPMENT INDUSTRY IN GUANGDONG PROVINCE -- BASED ON THE PERSPECTIVE OF KNOWLEDGE WORKERS**

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### **Abstract**

*The popularization and rapid development of information technology promote the technological innovation of traditional industries. Today's society has entered a new economic era dominated by knowledge. The factors of productivity have changed qualitatively. Knowledge has become an important input factor in economic development. Knowledge workers are gradually replacing traditional labor force and becoming the core of human capital. As the core human resources of an enterprise, knowledge-based employees integrate knowledge, technology and information. Therefore, thinking about how to effectively improve the job satisfaction of knowledge workers can make enterprises fully tap the talents of employees, and enhance the sense of identity and belonging of employees to the enterprise. In recent years, China's software development industry has developed rapidly, and has gradually become an important force to support and promote economic and social development. The rise of emerging industries such as cloud computing, artificial intelligence, big data and the Internet of things has led to the development of the times, but also made the competition among software development enterprises more intense. How to better attract this type of talents, fully stimulate their internal potential, make them actively serve the enterprise, effectively measure and evaluate the job satisfaction of knowledge-based employees, and then improve the management, which is worthy of further exploration and solution for software development enterprises. Through the survey of the satisfaction of knowledge workers in software development industry, combined with the characteristics of knowledge workers, fully improve the satisfaction of knowledge workers is the guarantee to promote the healthy and sustainable development of enterprises. Guangdong Province is one of the most important high-tech centers in China. This paper selects the knowledge-based high-tech employees of five software development enterprises in Guangdong Province as the research*

*object. Through the comprehensive use of literature research, interview research and questionnaire survey, the current situation of software development industry is comprehensively understood and analyzed one by one. First of all, based on the domestic and foreign research status and related theories, this paper analyzes the satisfaction status of knowledge workers in Guangdong Province through in-depth interviews and questionnaires. Combined with the characteristics of knowledge workers, this paper selects five factors that affect employee satisfaction in software development industry, namely, work itself, job return, employee personal development, knowledge management and corporate culture. Then, SPSS17.0 software is used to test the reliability and validity of the data collected in the questionnaire survey. The empirical results show that five key factors, including work itself, job return, employee personal development, knowledge management and corporate culture, are positively correlated with the satisfaction of knowledge workers in software development industry of Guangdong Province, among which job return has the most significant impact on employee job satisfaction. This paper discusses the influencing factors and degree of job satisfaction of knowledge workers in software development enterprises in Guangdong Province, aiming to put forward scientific and reasonable suggestions for improving the job satisfaction of knowledge workers in software development enterprises. Therefore, combined with the results of empirical research, according to the actual situation of software development industry in Guangdong Province, and combined with the characteristics of knowledge-based employees, the following four aspects of policy recommendations are put forward to improve the satisfaction of knowledge-based employees: to improve the salary and welfare system of enterprises; to establish a training and growth mechanism to adapt to the development of talents; to adhere to the principle of people-oriented and strengthen the construction of corporate culture.*

**Keywords:** Software development industry, Knowledge workers, Job satisfaction, Influence factor, Empirical analysis

## INTRODUCTION

### Background of Study

Under the background of the rapid development of China's economy, the software development industry has also been synchronous development. Information industry has become one of the pillar industries in China, which plays an extraordinary role in promoting the all-round development of China's economy and society. With the rapid development of big data, cloud computing, Internet of things, artificial intelligence and mobile Internet technology, it has gradually become an important driving force to boost innovation in other industries. In view of the importance of software development industry, the state has issued a series of strategic policies to ensure the healthy development of software development industry. (Aljohani 2018;

Zhao and Kou 2019; Chen 2018; Zhang 2018; Dong 2019; Ma 2019; Liu 2019)

For example, on December 19, 2016, the State Council issued a notice on printing and distributing the national strategic emerging industry development plan during the 13th Five Year Plan period. The notice clearly proposes to promote the leapfrog development of software development industry and expand the new space of network economy. (Chen 2018; *Aljohani 2018*). Through the promotion of Internet of things, cloud computing, artificial intelligence and other technologies, we will comprehensively realize the application in various industries, gradually build a new generation of software development industry system, realize the interconnection of everything, intelligent coordination, security control, integration and innovation, and accelerate the construction of "Digital China". (Zhang 2018; Ma 2019)

Guangdong Province is not only a leading province in China's reform and opening up and a strong province in economy, but also a strong province in science and technology. It has a very prominent driving function and a pivotal strategic position in the overall development of the country. In recent years, in order to thoroughly implement the spirit of general secretary Xi Jinping's directive instructions on Guangdong's work, Guangdong has actively taken the innovation driven development war as the core strategy of economic and social development and the overall starting point of economic restructuring, focusing on promoting major initiatives such as the cultivation of new and high technology enterprises, the construction of new R & D institutions, the technological transformation of enterprises, and the incubation and breeding system. Further focus on industrial development, highlight scientific and technological support, and strengthen technological transformation. In this context, opportunities and challenges coexist. On the one hand, with the support of policies, the development prospect of software development industry in Guangdong Province is very good. On the other hand, with the rapid growth of the number of enterprises, the industry competition is becoming more and more intense, which also brings about the increase of employee mobility, which brings certain losses to the company. First, the excessive turnover rate will increase the company's employment costs, more importantly, the departure of talents who master key information in the enterprise, as well as the risk of leakage of core secrets to the company, which will have a very adverse impact on the normal operation of the enterprise. Second, the work status and abnormal emotions of the former employees during the period of preparing to leave, as well as the resignation news, will also have a negative impact on the existing employees. The turnover of important employees is more complex, which is not only a great loss to the enterprise, but also causes the psychological fluctuation of all employees. (Chen 2018; Zhang 2018)

In order to stand firm in the increasingly fierce market competition, enterprises need to focus on how to effectively recruit and stabilize talents. The competition for talents is an important issue in today's society. The competition for talents has gradually evolved into the focus of enterprises, governments and other parties. If you want to stand out in the fierce competition, you should lay a solid foundation for the development of the enterprise. As a product of the new economic era,

software development industry is a knowledge intensive industry, and its survival and development depend on the acquisition and reproduction of knowledge. Knowledge is in the hands of knowledge-based talents, which also determines that the development of software development industry must be based on knowledge-based talents. (*Aljohani 2018*). Knowledge talents are an important factor for the development and growth of enterprises, and they increasingly determine the success or failure of software development enterprises. At the same time, knowledge workers often have the characteristics of strong pursuit of self realization and loyalty to specialty rather than enterprise. The all-round development of knowledge economy also provides unlimited possibilities for their free flow. How to improve the satisfaction of knowledge workers to the enterprise, and then make employees have a sense of loyalty to the enterprise is the problem that Guangdong software development industry enterprises need to study under the current background (*Aljohani 2018; Dong 2019; Liu 2019*)

### **Research Question**

In order to solve the problems described above, it is necessary to study the main factors of satisfaction of knowledge workers in software development enterprises. This paper intends to achieve the final research goal by studying the relevant theory and literature research, to understand the factors that affect the satisfaction of knowledge workers to the enterprise. (*Sahibzada et al., 2020; Huang et al., 2020*)

### **Research Objective**

This study selects five software development enterprises in Guangdong Province as the research object, using the method of combining theoretical research and data analysis. It is expected that through in-depth interviews and surveys on employee satisfaction of knowledge-based employees in enterprises, we can understand the loyalty and satisfaction of knowledge-based employees to enterprises. Help software development enterprises to carry out better incentive plans and improvement measures according to the real demands of employees, and strengthen enterprise human resource management. wledge workers.

## **LITERATURE REVIEW**

### **Employee Satisfaction**

Hoppock (1935) first put forward the concept of employee satisfaction in 1935. He thinks that employee satisfaction is the psychological and physiological feelings of employees on the working environment and job itself, that is, people get a certain degree of satisfaction from work, and it is the subjective emotional response of employees to the working environment. In this paper, the employee satisfaction mainly refers to the degree of good or bad psychological feeling

of the enterprise in many aspects, such as company culture, working conditions, intensity, work pressure, promotion space, interpersonal relationship and working environment. In the actual work, the level of job satisfaction will have a greater impact on employees' work enthusiasm, efficiency, performance or turnover intention. (Wang et al., 2020; Santi et al., 2020; Ampofo, 2020)

## Previous research

From the research of Hoppock (1935), many experts and scholars at home and abroad have explored employee satisfaction and defined it from different angles. The definition of job satisfaction is different according to the background of the researcher and the research object. So far, there is no widely accepted concept. However, it can be summarized as comprehensive definition, expectation gap definition and reference architecture definition (Xu Zhengguang, 1997). Among them, the comprehensive definition features that employee satisfaction is regarded as a single concept, which does not involve the cause and process of employee satisfaction. The definition of gap refers to that the degree of job satisfaction is defined according to the difference between the individual's actual reward and the reward he thinks he should be paid. Scholars who hold the definition of reference framework believe that the most important factor influencing people's attitude and behavior is not the objective characteristics in the organization or work, but the subjective perception and interpretation of these objective characteristics, which are influenced by personal reference framework. The following is a brief summary of the views of scholars who hold these three definitions

First, comprehensive concept. In other words, job satisfaction is explained as a single concept, and it is considered that job satisfaction is the comprehensive response of employees to their work itself and environment. It does not involve the causes and processes of job satisfaction, nor does it involve all dimensions of job satisfaction. Smith & Hulin (1969) believed that job satisfaction was the result of comparing job characteristics according to one's own standards. Zheng Zheng (2016) links employee satisfaction with performance level, that is, employee satisfaction refers to the satisfaction of an individual as a professional, so it has obvious characteristics. The higher the employee satisfaction, the higher the job performance.

Second, the concept of gap: job satisfaction is mainly determined by the gap between the actual and expected pay. For example, Schultz (1982) thinks that job satisfaction is determined by the gap between the value an employee actually obtains in a specific work environment and the value he expects to obtain. Yang Naiding (2000) defined employee satisfaction from the perspective of individual cognition: when an employee compares the perceived effect of the enterprise with his expected value, he / she will be satisfied if he / she exceeds the expected value; if he / she reaches the expected value, he / she will be basically satisfied; if he / she is lower than the expected value, he / she will be dissatisfied. Pan Jue et al. (2017) also discussed the psychological differences of employees.

Thirdly, the concept of factor type: the composition of job satisfaction contains many elements, which has an important impact on the employees' work attitude. The level of job satisfaction depends on the individual's perception of all aspects of work, which is the subjective perception of the individual to the objective, and is mainly affected by the individual's self-awareness. Porter & Lawler (1986) believed that job satisfaction is people's psychological feelings about their work, involving many factors related to attitude and feeling. Huang Cuixia et al. (2002) put forward that employee satisfaction is relative to the individual's life satisfaction and overall satisfaction, specifically refers to the satisfaction degree of an individual as a professional. It is an evaluation of the degree of satisfaction obtained by comparing the expectation of the combination of salary and working environment, etc., and the combination of salary and working environment. Zhao Xia (2017) believes that employee satisfaction mainly refers to employees' attitude towards the work itself and the working environment. Specifically, it refers to the employee's satisfaction with the work and the work process, which is considered to be the employee's attitude towards various factors in the work process, that is, the employee's overall response to the whole work.

The measurement methods of employee satisfaction vary with different dimensions of job satisfaction. At present, the most widely used measurement methods include single overall evaluation method and work element summation method.

### **Knowledge worker**

With the advent of the era of knowledge economy, science and technology are developing rapidly. As a result of the development of science and technology, the wealth created by human society is growing at a double speed. Therefore, in the new round of wealth distribution, the focus of competition between countries and enterprises naturally turns to the competition of technology and knowledge. As the carrier of knowledge, technology and information, knowledge-based employees have become the core of enterprise management and the most important resources that countries compete for. (Zhao and Kou 2019; Zhang 2018)

Peter F. Drucker, the world famous management master, first put forward the concept of knowledge worker in his book "the milestone of tomorrow" (1959). He defined knowledge workers as "those who master and use symbols and concepts and work with knowledge or information". Since then, scholars at home and abroad have made a variety of definitions on the concept of knowledge-based employees, among which the following definitions are the most representative: Drucker further defined knowledge-based employees as those who mainly use mental ability rather than physical strength as their main work content in 1978. Davenport (1996) thinks that the main activities of knowledge workers are to find and acquire existing knowledge, create new knowledge, package and reorganize knowledge, apply existing knowledge and reuse knowledge, which belong to knowledge work. The people who carry out these jobs are knowledge workers. On the other hand, Fritz can also define knowledge transmission and

knowledge transfer from the perspective of knowledge transmission and knowledge transmission. From the perspective of knowledge capital theory and human capital theory, domestic scholars Wang Xingcheng et al. (1998) pointed out that knowledge-based employees refer to the staff engaged in production, creation, expansion and application of knowledge, which bring knowledge capital value-added for enterprises and take it as their occupation. According to Lei Qiaoling (2006), knowledge workers refer to those who have strong ability to learn and innovate knowledge. They are mainly engaged in knowledge creation, dissemination, sharing and application in enterprises, and can create greater value for enterprises. (*Aljohani 2018*)

In this paper, the definition of knowledge workers is: those who are engaged in knowledge innovation work, can realize the exchange, diffusion and application of knowledge, and can bring value-added for enterprises. To understand this concept, we need to focus on the following two aspects: first, knowledge workers are mainly engaged in creative mental work, not just in general sense; second, knowledge workers can bring value-added to enterprises. (Chen 2018; *Aljohani 2018*)

## METHODOLOGY

### Research Design

Based on the study of relevant theories and literature, this paper selects five representative software development enterprises in Guangdong Province. According to the in-depth interviews with knowledge-based employees, this paper selects five influencing factors of work itself, return on work, employee personal development, knowledge management and corporate culture to prepare a questionnaire to measure the job satisfaction of knowledge workers in these five aspects. In terms of questionnaire design, based on the Minnesota job satisfaction scale, the Likert scale was refined, and a questionnaire on Influencing Factors of knowledge workers' satisfaction was developed by using the seven level scale as a tool for data collection. Among them, the questionnaire was filled in anonymously, and the information of the respondents was kept confidential. After issuing the questionnaire and collecting it within the specified time, the invalid questionnaire was eliminated, and the data of the returned questionnaire were input and preliminarily sorted out. A series of data processing and analysis were carried out by using Excel, SPSS17.0 and other data statistical analysis software. First of all, make a preliminary statistical description of the samples to understand the basic information of the survey samples. Then, the reliability and validity of the questionnaire were tested to test whether the designed scale is consistent, and whether the data obtained is suitable for factor analysis. After proving that the data is suitable for factor analysis, principal component analysis method is used to extract and name the main factors. Finally, Pearson correlation analysis method is used to analyze the correlation between the extracted main factors and job satisfaction of knowledge workers, and

multiple regression equation is established to analyze the influence of these five independent variables on overall satisfaction, and draw a conclusion to verify the research hypothesis. Combined with a series of results of empirical analysis, considering the actual characteristics and situation of knowledge workers in Guangdong software development enterprises, this paper puts forward suggestions for software development enterprises to improve their job satisfaction from various aspects.

### **Sampling of Analysis**

Guangdong Province is the frontier area of science and technology innovation in China. According to the data of Guangdong Software Industry Association, there are more than 4000 software development enterprises in Guangdong Province. In this paper, through the comparative analysis of the scale, business scope and development of the listed companies with intensive knowledge workers in Guangdong Province, five representative software development enterprises in Guangdong Province are selected as samples. They are: Guangzhou Jiesai Technology Co., Ltd., Shenzhen Yinzhijie Technology Co., Ltd., Shenzhen Changliang Technology Co., Ltd., Silu Vision Technology Co., Ltd., and Zhuhai Huijin Technology Co., Ltd.. The proportion of knowledge-based employees in these selected enterprises has reached more than 80%.

**Table 3-1 Summary of enterprise information**

Name	Year	No. of employees	Place	Business scope
Jiesai	1994	Above 1000	Haizhu District, Guangzhou	Software development; information system integration services; communication facilities installation engineering service network technology research and development; computer technology development, technical services
Yinzhijie	1998	500-999	Futian District, Shenzhen	Computer software and hardware, network technology development, technical services; information technology research and development, technical consultation and technology transfer
Changliang	2002	Below 500	Nanshan District, Shenzhen	Development and service of computer software, hardware and electronic instruments, development and service of

				network technology, and computer system integration
Silu	2000	1000-4999	Futian District, Shenzhen	Computer animation, image design, multimedia technology development, virtual digital technology development, network technology development, education software technology development and sales
Huijin	2005	100-499	Zhuhai Software Park	Design, research and development, wholesale, retail and other commercial wholesale and retail of electronic computer software and hardware, electronic products, security technology products, communication equipment

## Instrumentation

This paper investigates the overall job satisfaction of employees. On the basis of previous theoretical and academic research, it mainly refers to the relevant factors in Minnesota Satisfaction Scale (MSQ) and job description scale (JDI). Based on the previous theories and academic research, this study divides the influencing factors of satisfaction into five dimensions, including work itself, return on work, personal career development, knowledge management and corporate culture. These dimensions include 25 subjective and objective factors that affect knowledge workers' job satisfaction. They are: work interest, professional matching, working environment, working hours, work pressure; salary, social security, bonus, paid vacation, other welfare; career development, training and further study, promotion opportunity, job rotation opportunity, talent echelon; knowledge collection, knowledge transmission, knowledge acquisition, knowledge sharing, knowledge innovation; core concept, management system and fair treatment, team work and leadership identification. According to these factors, the corresponding problems are put forward for each dimension.

## FINDINGS AND DISCUSSIONS

### Profile of Respondents

This section is to conduct a small-scale in-depth interview on the selected five enterprises' knowledge-based employees by random sampling. On the one hand, through the collation and analysis of the interview data, verify whether the above hypothesis is reasonable; on the other hand, through the interview, in-depth understanding of the factors affecting the satisfaction of

knowledge-based employees in software development enterprises, to understand the crux of employees' dissatisfaction, and to provide the basis for the following improvement suggestions.

### **Purpose and object of the interview**

#### **(1) Purpose of the interview**

The purpose of in-depth interview on the selected knowledge-based employees in software development enterprises mainly includes three aspects: firstly, to obtain the working conditions of knowledge-based employees through interviews. Specifically including the position level, working years and daily main responsibilities and scope, so as to understand the salary level, work intensity and stress intensity of the interviewees. Secondly, through interviews to understand the current situation of employee satisfaction with the current job and its more important factors of satisfaction. For example, ask the employees whether they are satisfied with the current overall work, and then lead to the relative satisfaction of all aspects of the company's current management and the causes of dissatisfaction, and then explore the influencing factors of the most dissatisfied employees. Finally, through the interview, preliminary collection of knowledge-based employees on the company's management suggestions. Ask employees if they want the company to improve some modules accordingly, and provide opportunities for employees to express their ideal improvement methods and channels, so as to collect information and provide feasible reference for subsequent writing promotion countermeasures and suggestions.

#### **(2) Interviewees**

(3) The selected knowledge workers of software development enterprises were randomly sampled and interviewed, and one-on-one interviews were conducted without external environment interference to ensure the privacy and randomness of the interviews. In order to ensure the rationality of the survey results, this interview survey selected more representative employees in terms of job rank, age group, education level and company age, and conducted in-depth interviews with a total of 25 knowledge-based employees. Among them, the company's headquarters personnel take one-on-one interviews, and site personnel take the form of field seminars. According to the designed interview time, each person interviewed for about 20 minutes, and the whole process was completed in about 1 month.

(4) In order to ensure that the satisfaction survey can cover evenly, 25 employees from four positions in five companies were randomly selected as the interviewees. The interviewees are engaged in technical posts such as design and development, operation posts such as copywriting promotion, marketing posts such as marketing planning, and functional posts such as financial administration. Among them, there are 3 middle and senior managers, 7 grass-roots managers, 10 professional and technical personnel and 5 ordinary staff.

**Table 4-1 Basic information of interviewees**

No.	Gender	Age	Position	Post	Work
1	Male	46	Middle and senior managers	Technology	Above 10
2	Male	42	Middle and senior managers	Marketing	Above 10
3	Female	44	Middle and senior managers	Functional	Above 10
4	Male	34	Grassroots managers	Operating	5-10 years
5	Female	32	Grassroots managers	Marketing	5-10 years
6	Male	32	Grassroots managers	Technology	5-10 years
7	Male	28	Grassroots managers	Operating	3-5 years
8	Female	30	Grassroots managers	Functional	3-5 years
9	Female	36	Grassroots managers	Technology	3-5 years
10	Male	30	Grassroots managers	Functional	3-5 years
11	Male	25	Professional and technical	Technology	1-3 years
12	Male	24	Professional and technical	Technology	1-3 years
13	Male	26	Professional and technical	Operating	3-5 years
14	Female	25	Professional and technical	Operating	1-3 years
15	Female	24	Professional and technical	Technology	Below 1 year
16	Female	26	Professional and technical	Marketing	3-5 years
17	Male	24	Professional and technical	Technology	Below 1 year
18	Female	26	Professional and technical	Functional	1-3 years
19	Male	28	Professional and technical	Marketing	3-5 years
20	Female	27	Professional and technical	Technology	3-5 years
21	Male	23	Staff	Marketing	Below 1 year
22	Female	22	Staff	Marketing	Below 1 year
23	Female	24	Staff	Operating	1-3 years
24	Male	22	Staff	Technology	Below 1 year
25	Female	25	Staff	Functional	1-3 years

Source: Author

#### 4.1.2 Interview outline design

The purpose of in-depth interview is to understand the status quo of employee satisfaction and employee needs through the interview of knowledge-based employees, so as to provide reference

for improving the satisfaction of knowledge-based employees. Interviews are mainly open-ended questions, which require respondents to answer questions according to their own objective conditions. The main interview design can be divided into three modules. First of all, the basic information of the respondents. It includes age, Department, post rank, education level, marital status and working years. Secondly, the basic content of interviewees' work. Through the simple self introduction of the interviewed employees, we can preliminarily understand the employees' intuitive feelings of the company's satisfaction. Finally, further understand the real satisfaction and needs of employees. By asking the interviewees whether they are satisfied with their current work, the factors affecting their satisfaction, the modules expected to be improved, and the specific suggestions for the improvement of the company's management, etc., we can understand the true attitude of employees to job satisfaction.

In the interview, according to the confidentiality agreement, the whole process and results of the interview will not flow out. Since the questions involved in the communication process are related to themselves, the interviewees highly cooperated in the conversation and gave detailed and detailed answers to each question. In addition, the order of the questions raised should be consistent. During the interview, we should do a good job in controlling, expand the related questions appropriately and obtain the valuable information to the maximum extent. The sincere answers and suggestions from employees themselves are very constructive to understand and improve their satisfaction. According to the interview design, a certain logic of questioning is formed to guide the interviewees to share various factors affecting their self satisfaction, and collect more useful information on the research topic through dialogue. There are 30 open questions in the outline of the interview (see Appendix B for details). The main questions of the interview can be divided into the following five aspects:

(1) Return on work mainly reflects employees' satisfaction with salary and benefits. Specifically, whether the current salary, benefits and performance system provided by the enterprise are in line with your daily work payment? Can it significantly motivate you? Do you expect a higher return on your work? ...

(2) Work itself mainly reflects the satisfaction of employees to the content, conditions and environment of daily work. It includes: do you think the current work is monotonous? Has your ability been brought into play in your work? Are you satisfied with the working environment and conditions of the enterprise? ...

(3) Personal career development mainly reflects whether all aspects of the current company are in line with and conducive to the career development plan of employees. It includes: does your current job meet your career development requirements? Does the company provide direction guidance for employees' personal development? Does the company provide training and further study that will help your career? ...

(4) Knowledge management mainly reflects employees' satisfaction with knowledge management. Specifically including: does the enterprise encourage employees to carry out knowledge innovation? Does the enterprise provide opportunities for employees to acquire new knowledge and technology? Are colleagues willing to transfer and share knowledge?

(5) Corporate culture mainly reflects employees' satisfaction with the company's current values and cultural atmosphere. It includes: do you agree with the current cultural concept and management system of the enterprise? What is the current team atmosphere? Have leaders and colleagues given enough support and cooperation when you need help in your work?

### **Analysis of interview results**

The above interviews collected knowledge-based employees of several companies on the internal management system materials, from which a large number of information reflecting the current situation of employee satisfaction was obtained, which provided guidance for the design of the questionnaire. After the interview survey, through the collection and collation of the interview survey results, it is found that the knowledge workers' satisfaction with the enterprise is also different due to the influence of return on work, the nature of work and other factors.

#### **(1) The general situation of the interview survey**

Generally speaking, the overall satisfaction of the interviewees is high. Among the interviewees, a total of 16 employees were satisfied with the current work status as a whole, 6 employees said they were not satisfied with the current work status to a certain extent, only 3 employees expressed serious dissatisfaction with their current work, and 36% of the respondents were dissatisfied with their current work. In addition, almost all the employees who participated in the interview survey said that through the employee satisfaction survey, they could better understand their position in the enterprise, examine their work ability and attitude, understand a series of decisions of the company and think about the future work direction, which is also a step to realize self-worth.

The interview survey is based on the five dimensions of return on work, work itself, career development, knowledge management and corporate culture. The results of sample interview are influenced by different positions and positions of knowledge workers, and may be different from the results of questionnaire survey. For example, employees at the management level of an enterprise may be more interested in and more sensitive to issues related to corporate culture and career development, while technicians and grass-roots employees may be more concerned about work itself and return on work due to the nature of their daily work. Generally speaking, the most important factor of employee satisfaction is return on work, which shows that they are quite satisfied with the salary and welfare level at the present stage. When the business performance is good, the knowledge-based employees also hope to have the return on work increase to a certain

extent. Finally, it concludes that the order of the influencing factors of knowledge workers' satisfaction is: return on work > career development > work itself > corporate culture > knowledge management.

## (2) Results of interview on the satisfaction of return on work

Through the interview results, it shows that knowledge workers pay attention to the fairness and rationality of the salary and welfare system. If employees get a reasonable return, they will fully mobilize their enthusiasm, initiative and creativity. As a health care factor of employee motivation, the improvement of return on work will directly improve employee satisfaction. Generally speaking, the employee satisfaction is relatively high in the return on work influencing factor. The satisfaction degree of knowledge-based employees to the specific material return, that is, salary, bonus, welfare and other aspects of the interview show that employees are more satisfied with salary and welfare. Only 3 person times proposed low satisfaction with salary and 2 person times proposed low satisfaction with welfare. Through further inquiry, it was found that the main reasons for these employees' dissatisfaction were too low overtime pay and unreasonable salary distribution. At first, I had high hopes for my work, said one of the employees. But compared with some other friends who do the same work in other enterprises, the income seems to be a little small, which makes me feel that there is no direct proportion between paying and obtaining. I hope the company can improve.

Relatively speaking, the satisfaction degree of the management staff to return on work is higher than that of the grass-roots staff. Most of the management staff are satisfied with the salary and welfare, especially the salary adjustment mechanism in the company's salary system. The increase of employee's salary with social salary conforms to the social development trend and meets the urgent needs of most employees. Based on this feature, they get a high level of satisfaction. In terms of welfare benefits, the company also paid according to the national policies, which did not cause dissatisfaction among most employees. The grass-roots employees first approved the current salary system and salary method, but thought that their basic wage level was low, and the actual salary after deducting social security and taxes was not high, which was not in line with the high intensity of physical labor to a certain extent.

In addition, the employees who participated in the interview believed that although the wages and benefits of the enterprise have increased in recent years, the salary and welfare are not the only return on work. Employees should not only value the material return of the enterprise, but also the invisible value brought by the enterprise to the employees. For example, the company provides employees with a good working background and a good company background, so that employees can get extra respect outside, so that employees feel proud of the company. Even if employees do not work in the current enterprise in the future, they can find better jobs with current work experience.

### (3) Results of interview on work itself satisfaction

In daily work, employee satisfaction with work itself and good working environment and working conditions are also very important. Generally speaking, the knowledge workers interviewed have a high degree of satisfaction with work itself. One of the interviewees said: my job is very simple, which is to sort out the daily information of the company. I am not very tired and the welfare of the company is very good. I am very satisfied. In this interview survey, we mainly resolve the influencing factors of work itself into two aspects. On the one hand, it is work itself, that is, whether the current work conforms to the staff's specialty and interest, so that their working ability and energy have been fully developed; on the other hand, it is the working conditions of the company, such as the working environment, facilities and equipment configuration and convenient use.

#### (1) Satisfaction with work itself

**Table 4-1 Work itself factor satisfaction evaluation table**

Item	Very Dissatisfied	Dissatisfied	Not satisfied	Neutral	Quite Satisfied	Satisfied	Very Satisfied
Interest in work	1.05%	5.03%	12.52%	15.67%	20.78%	37.74%	7.21%
Major matching	1.78%	4.98%	10.12%	13.56%	23.80%	34.54%	11.22%
Working environment	0.54%	2.32%	8.75%	10.78%	30.78%	35.12%	11.71%
Working hours	2.87%	7.93%	11.72%	9.12%	35.63%	29.87%	2.86%
Working pressure	2.67%	7.53%	13.89%	10.76%	28.87%	26.53%	9.75%

Source: Author

In terms of work interest, major matching and working environment, more than 80% of the knowledge-based employees in software development industry in Guangdong province hold a general to very satisfactory attitude. Among them, more than 88% of the knowledge workers in the "general" to "very satisfied" working environment in the software development industry in Guangdong Province have paid more attention to providing comfortable working environment for employees. In terms of working hours and work pressure, the satisfaction of employees was slightly lower, but more than 70% of employees held the basic attitude of approval, and about 20% of employees had below average attitude. This may be due to the fact that although

enterprises are providing employees with as much work autonomy and flexibility as possible, there are still some practical problems that lead to longer working hours of employees, which also increases the work pressure of employees.

### (2) Satisfaction with return on work

**Table 4-2 Return on work factor satisfaction evaluation form**

Item	Very Dissatisfied	Dissatisfied	Not satisfied	Neutral	Quite Satisfied	Satisfied	Very Satisfied
Wage income	2.74%	3.87%	5.65%	15.79%	30.78%	30.74%	10.43%
Social security	4.23%	7.89%	10.34%	25.54%	23.80%	24.54%	3.66%
Bonus	0.78%	2.43%	4.56%	10.78%	32.78%	35.12%	13.55%
Paid leave	3.78%	6.52%	9.56%	28.98%	25.63%	19.87%	5.66%
Other	0.76%	1.78%	3.23%	6.74%	38.87%	36.53%	12.09%

Source: Author

In the aspect of return on work, through the survey of these items, it reflects the satisfaction of knowledge workers in Guangdong software development industry on salary and welfare. It can be seen that the employees surveyed are more satisfied with salary, bonus and other benefits, which is consistent with the general impression of high income and good welfare in software development industry. As a technology industry with good development momentum, the satisfaction of employees in terms of income is basically high. On the other hand, the satisfaction of social welfare and paid leave is relatively low, with about 50% holding a general attitude or below. This is related to the fact that the software development industry has more work tasks and less rest time. In addition, the software development industry is mostly private enterprises, which is inferior to state-owned enterprises and central enterprises in terms of social security such as five insurances and one fund, which also leads to low employee satisfaction.

### (3) Satisfaction with personal career development of employees

**Table 4-3 Personal career development factor satisfaction evaluation form**

Item	Very Dissatisfied	Dissatisfied	Not Satisfied	Neutral	Quite Satisfied	Satisfied	Very Satisfied

	<b>d</b>		<b>d</b>		<b>d</b>		<b>d</b>
Career development	1.74%	3.67%	7.65%	15.78%	27.73%	32.74%	10.69%
Training and further study	3.23%	8.86%	12.34%	27.54%	20.80%	18.54%	8.69%
Promotion opportunities	1.58%	3.43%	6.76%	12.75%	28.78%	32.12%	14.58%
Job rotation opportunities	0.68%	1.52%	2.56%	5.55%	35.78%	38.87%	15.04%
Talent echelon	0.36%	1.08%	2.23%	34.74%	26.87%	26.53%	8.19%

Source: Author

## Summary

This paper analyzes the data collected from the questionnaire of knowledge-based employee satisfaction in software development industry in Guangdong Province, finds out the strength and weakness of the influence of various related factors on the overall satisfaction of employees, and understands the overall situation of the satisfaction level of software development employees in Guangdong Province (*Aljohani 2018*) Employees are the core force of enterprise development. Improving employee satisfaction is not only conducive to improving the enthusiasm of employees, but also for the rapid development of enterprises. The empirical study on the factors influencing the satisfaction of knowledge employees in software development enterprises in Guangdong Province is to improve the level of human resource management of software development enterprises, improve the job satisfaction of knowledge-based employees, fully stimulate the enthusiasm and creativity of knowledge-based employees, and provide the basis for improving the performance level of enterprises. (*Aljohani 2018*)

According to the empirical research conclusion, we can conclude that work itself, return on work, employee career development, corporate culture, knowledge management and other factors have positive effects on job satisfaction of knowledge-based employees. Especially, work itself, return on work, employee career development, corporate culture and other factors are significantly positively correlated with the overall satisfaction of employees. Therefore, this chapter first summarizes the conclusions of the research, and then puts forward countermeasures and suggestions to improve the job satisfaction of knowledge-based employees in software development enterprises from four aspects: work itself, salary and welfare, personal career development and corporate culture. It is hoped that this paper will help software development enterprises to make reference in human resource management practice, help them improve their satisfaction with knowledge workers, and to retain talents for enterprises to a greater extent and realize healthy development of enterprises.

## Discussion and Conclusion

Through literature review, theoretical analysis, questionnaire survey and empirical analysis, this paper verifies the hypothesis that work itself, return on work, employee career development, knowledge management, and corporate culture have a significant positive impact on knowledge workers' satisfaction (Zhao and Kou 2019; Aljohani 2018; Chen 2018). The conclusions are as follows:

First, on the whole, through field interviews, questionnaire survey and empirical analysis, it is found that the job satisfaction level of knowledge workers in software development enterprises is on the medium level, and there is still room for improvement. It is urgent to improve and help employees grow and promote sustainable development of enterprises. Through the descriptive statistical analysis of the data of the questionnaire survey, 74.18% of the knowledge-based employees in the software development enterprises surveyed hold the general or above job satisfaction evaluation, and most of the knowledge-based employees hold the basic satisfaction attitude to the work, and the number of the two poles is not high. (Finne, 2020; Wegman & Hoffman, 2020)

Secondly, work itself, return on work, employee career development, corporate culture and knowledge management have positive correlation with job satisfaction of knowledge workers in software development enterprises. Among them, work itself, return on work, employee career development and corporate culture have significant positive correlation with job satisfaction in software development enterprises. It can be seen from the degree of influence that employees pay more attention to return on work and personal career development.

Thirdly, the order of the influence of these factors on the overall job satisfaction of knowledge workers is: return on work > employee career development > work itself > corporate culture > knowledge management. The specific explanations are as follows:

(1) Return on work has the most significant effect on employee job satisfaction. This is because the salary and welfare is the basic guarantee for the survival and development of employees, and the compensation and welfare is the basis for employees to produce higher level needs and pursuits. Reasonable salary and welfare can eliminate employees' dissatisfaction. The higher the salary and welfare, the higher the employee's recognition of work and self, and the higher the sense of achievement and social status, the higher their satisfaction.

(2) Personal career development has the second effect on employee job satisfaction. The reason is that employees have higher requirements in training, further study and participation in major projects. In addition, the job requirements of knowledge and technology employees are different from those of other positions. They pay more attention to whether the current work can be consistent with career related trends. As long as enterprises can help them realize their pursuit of

career growth and maintain their "employability" in technology, the higher their sense of achievement is, the higher their sense of satisfaction in their work will be.

(3) Most of the employees in software development enterprises are knowledge workers with high education and high technology, and they have higher requirements for work itself. According to Maslow's hierarchy of needs theory, safe and stable work only meets the basic needs of employees, and they want to pursue a higher level of needs, that is, the needs of self realization. Part of self realization comes from work itself. This requires that the work content is in line with personal interests and the work is challenging, so that employees can gradually realize their self-worth in the process of completing the work, and get a sense of satisfaction and achievement in the work.

(4) Corporate culture includes the value concept and humanistic atmosphere of an enterprise. Corporate culture includes enterprise values, enterprise management system and core concepts. Employees' high recognition of corporate culture helps them obtain satisfaction in their work. The humanistic atmosphere refers to the team atmosphere of an enterprise. In software development enterprises, team climate has a significant impact on job satisfaction. These teams tend to be knowledge intensive. From the perspective of academic qualifications, undergraduate and master's degrees are the main force. Most of them are very independent people with strong self-awareness and self-esteem. They will have a strong sense of competition in the team cooperation, and the competitive emotion will be inadvertently revealed in their usual behavior and language. If the communication is not smooth, contradictions will arise and internal employees will be dissatisfied.(Dong 2019; Aljohani 2018; Ma 2019; Liu2019 )

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